CAUSES AND EFFECTS OF POOR COMMUNICATION IN CONSTRUCTION PROJECTS

YASER MOHAMMED RAGEH GAMIL

A thesis submitted in
fulfillment of the requirement for the award of
The Degree of Doctor of Philosophy in Civil Engineering
Faculty of Civil Engineering & Built Environment
Universiti Tun Hussein Onn Malaysia

AUGUST 2020

Dedicated to my loving parents and siblings for their unconditional support and prayers. It is also dedicated to my beloved wife (Ahlam), son (Ammar), and daughter (Leen) for their patience, endurance, and support.

ACKNOWLEDGMENT

First and foremost, all praises are due to Allah S.W.T, the most gracious and the most merciful for the never-ending blessing and mercy, guiding me to the right path, and granting me the opportunity and strength to start, pursue, and accomplish this work.

I am beyond grateful to my generous supervisor Professor Dr Ismail Abdul Rahman for his open-handed and steadfast support, fatherly advice and outstanding guidance throughout my study journey. His guidance, coordination, and substantial support empowered me to complete my study. May Allah bless him and grant him forgiveness and health. The same wish goes to my co-supervisor Dr Sasitharan Nagapan for his continual support.

I would also like to extend my appreciation and gratitude to my parents, siblings and my loving wife for their endless and relentless support and motivations during my study. My family is the ultimate source of encouragement and persistence to the completion of my study.

Finally, I would like to stretch my appreciation to all the participants in my study, to the faculty of civil engineering and built environment and centre for graduate studies staff for their assistance and to everyone who has directly or indirectly helped and supported me during my study. It is also extended to the ministry of higher education Yemen for the financial support during my study.

ABSTRACT

Effective communication is an indispensable element to the successful completion of construction projects. However, maintaining a smooth and effective communication process is a challenge to construction practitioners. Many studies have been carried out on the communication in construction. Nevertheless, there is still lack of studies focusing exclusively on the identification of limited causes and effects of poor communication in the construction projects. Hence, this study is not only intended to entirely identify and assess the causes and effects of poor communication but also to establish the relationships between them. The study was conducted using mix method approaches where the qualitative approach was carried out using exploratory interviews with ten selected construction experts to gain insights on the issues of poor communication in Malaysian construction. The information gathered from interviews were analysed using thematic content analysis. In the quantitative approach, a questionnaire survey was used to collect data from 262 respondents to assess the cause and effect factors. The questionnaire was designed based on the causes and effects identified from the literature and the exploratory interview which simultaneously resulted in identifying 43 causes and 23 effects. The collected data were analysed using statistical univariate and multivariate approaches. The univariate analysis adopted average index score to rank the significance level of the factors and found five most significant causal factors which are *lack of communication system and platform, improper communication channel, lack of appropriate communication medium, poor project information management, and lack of formal execution of communication*. While the five most severe effects of poor communication are *information overlapping, time overrun, cost overrun, dispute, and high stress in the workplace*. The collected data were further used to develop a structural relationship model for the causes and effects using Smart-PLS. The model was assessed and validated for both measurement and structural components. The model addressed the relationships between causes and effects which then verified by construction experts. The structural equation model with the outcome from exploratory interviews were combined to produce a framework of poor communication causes and effects. The framework also introduced the mitigation measures of poor communication. The findings of this research are helpful to accommodate the need for construction practitioners and stakeholders to understand the most significant causes, most severe effects, and offered mitigation measures of poor communication.

ABSTRAK

Komunikasi berkesan adalah elemen penting untuk penyiapan projek pembinaan yang berjaya. Di samping itu, mengekalkan kelancaran dan keberkesanan proses komunikasi adalah cabaran kepada pengamal pembinaan. Banyak kajian telah dijalankan terhadap isu komunikasi dalam pembinaan berkaitan dengan konsep, teknologi, perantara dan cabaran. Walau bagaimanapun, masih terdapat kekurangan kajian yang menumpukan khusus terhadap pengenalpastian terhadap punca dan kesan komunikasi yang lemah dalam industri pembinaan. Oleh itu, kajian ini bukan sahaja bertujuan untuk mengenalpasti dan menilai punca dan kesan faktor komunikasi yang lemah dan untuk mewujudkan perkaitannya. Kajian ini dijalankan menggunakan pendekatan kaedah campuran di mana pendekatan kualitatif dijalankan menggunakan temubual penyiasatan dengan 10 pakar pembinaan yang terpilih untuk mendapatkan pandangan terhadap isu komunikasi yang lemah dalam pembinaan di Malaysia. Maklumat yang diperolehi daripada temubual di analisis menggunakan pendekatan tematik. Melalui pendekatan kualitatif, kaji selidik digunakan untuk mengumpul data daripada 262 responden untuk menilai faktor punca dan kesan. Soal selidik direkabentuk berdasarkan punca dan kesan dikenalpasti daripada literatur dan temubual penyiasatan di mana pada masa yang mengenalpasti 43 punca dan 23 kesan. Data yang dikumpulkan di analisis menggunakan pendekatan statistik univariat dan multivariat. Analisis univariat menggunakan menggunakan skor indek purata untuk menentukan kedudukan tahap perkaitan bagi faktor dan mendapati 5 faktor paling berkaitan iaitu platfom dan sistem komunikasi yang lemah, saluran komunikasi yang tidak sesuai, perantara komunikasi bersesuaian yang lemah, pengurusan maklumat projek yang lemah, dan perlaksanaan formal komunikasi yang lemah. Sementara itu, 5 kesan yang paling teruk komunikasi yang lemah ialah pertindihan maklumat, masa berlebihan, kos berlebihan, pertelingkahan, dan tekanan di tempat kerja. Data yang dikumpulkan digunakan dengan lebih lanjut untuk membangunkan model hubungan berstruktur di antara punca dan kesan menggunakan perisian Smart-PLS. Model ini dinilai dan disahkan untuk kedua-dua komponen pengukuran dan yang mana dipertimbangkan model keseluruhannya adalah sesuai. Model yang merujuk kepada punca dan kesan tersebut kemudiannya disahkan pakar pembinaan. Dapatan kajian dapat membantu untuk mengenalpasti dan mengaitkan faktor punca dan kesan komunikasi yang lemah dalam kitaran projek pembinaan.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF SYMBOLS AND ABBREVIATIONS

PMI	-	Project Management Institute
BSI	-	British Standards Institution
PMBOK	-	Project Management Body of Knowledge
PWD	-	Public Works Departments
CIDB	-	Construction Industry Development Board, Malaysia
CI	-	Construction Industry
GDP	-	Gross Domestic Product
IBS	-	Industrialized Building System
PLS-SEM	-	Partial Least Square -Structural Equation Modeling
IMS	-	Information Management System
AI	-	Average Index
BIM	-	Building Information Modelling
ICT	-	Information Communication Technology
UTHM	-	Universiti Tun Hussein Onn Malaysia
BEM	-	Board of Engineers
P.Eng	-	Professional Engineer
CSV	-	Comma Separated Value
AVE	-	Average Variance Extracted
CR	-	Composite Reliability
Q^2	-	Predictive Relevancy
R^2	-	Coefficient of Determination
CV- Red	-	Cross Validated Redundancy
CV-Com	-	Cross Validated Communality
PRSED	-	Public Relations Stakeholders' Engagement Department

CHAPTER 1

INTRODUCTION

1.1 Research background

In recent years, the construction industry has expanded significantly and become one of the leading industrial sectors for the development of the society and economy. Also, it is one of the primary sectors for job generation (Isa *et al.*, 2013). Therefore, its growth is one of the criteria used for evaluating the progress level of a nation, and its sustainable growth is essential for the society and its potential expansion of urbanization (Dainty *et al*., 2006).

Typically, the construction industry has unique characteristics in comparison with other industrial sectors where it is a dynamic, multifaceted, complex, multidisciplinary, and expandable (Jean, 1998; Anna & Lars-Erik, 2002; Senaratne & Ruwanpura, 2016). Consequently, these characters are accompanied with many challenges and problems such as poor quality of construction, poor performance, cost and time overruns, accidents, poor communication, project failure, and other issues (Alaghbari *et al.*, 2007; Abd El-Razek *et al.*, 2008).

Communication in the construction project lifecycle is indispensable component to the success of the projects because it involves in all the project stages of the project as a method of imparting and exchanging project information (Dainty *et al.*, 2006). For that reason, maintaining a proper process of communication and effective flow of information can be a significant challenge due to the vast amount of information and the number of parties engaging in a single project (Loosemore & Lee, 2002). On that account, poor communication develops and becomes as a global phenomenon in construction projects (Zulch, 2012). It is also considered as one of

the hindrances to maintaining a steady execution process and effective project delivery (Senaratne & Ruwanpura, 2016).

Poor communication is the term used to describe the unsuccessful delivery of project information, the wrong selection of channelling, and improper timing of information distribution (Dainty *et al.*, 2006). In a corresponding finding, a report released by the Project Management Institute (PMI) (2013) revealed that more than half of all project budget risk is due to ineffective communications, improper channelling, and inaccurate time management of information dissemination. The report further elaborated, inferior and substandard communications is the primary cause of project failure.

Furthermore, the British Standards Institution (BSI) (2003) estimated the cost required to correct defects due to ineffective communication of project information is valued approximately £20 billion annually in the United Kingdom (UK) construction industry. It also emphasized that for better communication and sharing information between designers, engineers, and contractors would likely to be essential to complete the project on time and budget.

Poor communication in the construction workplace leads to many other negative impacts. Frustration, friction, tense environment, and demotivation are among the negative impacts of poor communication (Zulch, 2012). These issues result in poor productivity and efficiency whereby employees tend to overreact upon any matter. Hence, effective communication is necessary to produce more understandable workplace and facilitate the interaction between employees to ensure a successful completion of the project.

Regarding the situation of Malaysian construction industry, it has a multicultural and multilingual society where different languages are used and different interpretations are developed during project information exchange (Kuang *et al.,* 2010). These characteristics of the industry requires in depth investigation on the status of communication, its process, and issues. Furthermore, the causes and effects of poor communication in construction industry needs to be identified and assessed to further avoid poor communication and produce smooth project implementation. Therefore, more effort and research are required to investigate the issue of communication in the construction industry especially on identifying the causes and effects of poor communication to construction projects success which is

expected to benefit the construction community to understand the issue of poor communication in their respective organizations.

1.2 Problem statement

Construction industry is a complex, diversified, and fragmented in nature whereby it is distributed over a large area, involves many parties, and the projects comprises of many activities and sub-activities (Dainty *et al.*, 2006). Hence, communication exhibits complixty and it is not performed in a timely and effective method (Pérez, 2017). Additionally, the project information is not delivered on a proper channelling, satisfying accurcy, and lacks of appropraite generation, inefficient storage and distribution (Crowe, 2005; Fichet & Giraud, 2007). Poor communication also appears in internal and external communication of the companies and seriously hampered the overall project performance (Xie *et al*., 2010).

Furthermore, poor and ineffective communication is attributed directly or indirecty to cause many challenges to the construction projects such as cost and time overruns, poor quality, lack of safety, rework, dispute among parties, improper coordination between project parties, and failure of the projects (Alaghbari *et al.*, 2007; Memon & Ismail, 2014; Brandt, 2017). Hence, parties engage in cnstruction projects require an effective communication to disseminate information especially during the construction stage.

According to the annual report produced by PMI (2013), ineffective communication among relevant parties contributes to 56% of the total risk of a project cost overrun. On account of that, exploring the issue of communication in the construction industry can be a massive hurdle because a considerable amount of technical and non-technical information encompasses in a single project (Loosemore & Lee, 2002; Brandt, 2017).

Correspondingly, poor communication leads to many other undesirable and negative consequences such as demotivation among project practitioners, poor productivity, poor performance, and suspension of the project (Zulch, 2012). A case study on the Danish construction companies found that 61% of errors in construction projects were made due to lack of communication and cooperation (Arnorsson, 2012). Also, Dainty *et al*. (2006) emphasized that poor communication is the root

cause of dispute and failure of projects. Furthermore, Project Management Body of Knowledge (PMBK) highlighted that a breakdown in communication leads to interruption of work processes, monitoring, poor cost management, and improper information management and exchange (PMBK, 2001).

Poor communication also results in unfavourable outcomes which include frustration, confusion, discouragement, and agitated environment wherein construction parties are not motivated to be productive and inspired to collaborate amongst them (Henderson *et al.,* 2016; Senaratne & Ruwanpura, 2016). Apart from that, a study by Hon *et al*. (2015) reported that nearly 30% of migrant workers are likely to have work-related injuries due to language barrier and miscommunication of health and safety procedures. Furthermore, Liao *et al.* (2014) introduces the importance of communication in generating a safe workplace in the concept of management of safety communication. In a different aspect, Gavilan & Bernold (1994) found that improper communication among construction stakeholders is a significant reason to cause waste generation in the construction industry in the form of rework and rehabilitation due to erroneous delivery of technical information.

Conventional methods of communication such as emails, progress meetings, progress reports are associated with many drawbacks. Of these drawbacks, project information is not delivered on time which lead to delay in decision making and improper selection of channels leads to delay of the project (Bryde *et al.,* 2013). Also, the rising of new technology such as video conferencing, communication platforms, and mobile applications are accompanied with challenges in term of the requirement of new methods and process to be compatible with the advancement of technology (Eastman *et al.,* 2011). The methods and process have to be in conformance with the new advanced technology (Bryde *et al.,* 2013).

Several studies on the communication research in the construction industry have discovered the issue of poor communication from different standpoints, for instance, an investigation by Cheng (2001) focused on the effects of having various skill levels to cause communication difficulties among the project team, and Thorpe & Mead (2001) discussed the methods of communication in construction projects. Besides that, Chen (2008) investigated the mechanism of information retrieval and transfer on construction sites. In a different perspective, Onyegiri, Nwachukwu & Jamike (2011) focused on the implementation of Information and Communication Technology (ICT) in the construction industry.

In respect to the communication during project stages, Md-Ulang (2012) explored the communication mechanism during the design stage, and Tipili *et al*. (2014) investigated the issue of communication during the execution stage. Also, Liu (2009) identified the critical factors for managing project communication during the execution stage. Moreover, Hassan & Rahman (2018) investigated the role of virtual design as a new method to improve communication during the bidding stage. Turley (2010) studied the frequency of communication by the managers. Zulch (2012) and Bandulahewa (2015) focused on managerial communication in term of mechanism and methods. On the other hand, Loosemore & Lee (2002) focused on ethnic minorities in construction and found that language and cultural diversity can cause poor communication. In addition to that, Debs (2016) studied the media influence on construction industry communication and focused on channelling and face-to-face communication.

In regards to modelling communication, a study by Campbell & Russo (2003) developed a model of social construction of mobile telephone and focused on the influence of mobile use within the personal communication. Another study by Cheng *et al* (2001) discovered a network model communication in the construction industry. However, the present models didn't cover the poor communication causes and effects and their relationships.

Despite the studies mentioned before, the issue of poor communication in the term of unsuccessful exchange of project information in the construction project still lacks of studies because researches in the subject of poor communication were limited to process, methods, and concepts and there has been no study reported on the identification and assessment of cause and effect factors of poor communication in the construction industry. Hence, this study intends not only to identify and assess the cause and effect factors, but also to establish the relationships model between the factors using advanced multivariate analysis.

1.3 Research questions

There have been numerous studies on the area of communication in construction industry. However, those studies are not explicit to fully cover the problem of poor communication and many questions are yet to be answered. Therefore, it is

imperative to thoroughly investigate, identify and study the poor communication in construction industry. Four questions arose from the research problem which are stated as follows:

i. What are the issues and challenges of communication in construction industry and the mitigation measures of poor communication?
ii. What are the causes and effects of poor communication in construction industry?
iii. What are the dominant causes and effects of poor communication in construction industry?
iv. How significant is the relationship between causes and effects of poor communication in construction industry?

1.4 Research aim and objectives

The main aim of this research is to establish the relationships between cause and effect factors of poor communication in the construction projects. To accomplish this aim, several objectives are introduced, which include:

i. To explore the communication in construction projects and identify the cause and effect factors of poor communication in the construction projects.
ii. To determine the dominant cause and effect factors of poor communication.
iii. To develop a relationship model of cause and effect factors of poor communication.
iv. To propose a framework of poor communication causes and effects relationships and also proposing mitigation measures of poor communication.

1.5 Research hypothesis

To achieve the objectives mentioned previously, this study hypothesized that several cause factors triggered to the occurrence of the poor communication and as consequence of the issue several effect factors have resulted. Two hypotheses are proposed for the research which are null and alternative:

i. *Null Hypothesis (H_0):* There is no statistically significant relationship between causes and effects to poor communication in construction projects.

ii. *Alternative hypothesis (H_a):* There is a statistically significant relationship between causes and effects of poor communication in construction projects whereby causes take the lead to negative effects.

1.6 Scope of the research

This is an applied research which aims to solve and analyse a prevailing communication issues in the construction projects. The research focused on the identification and assessment of causes and effects of poor communication and limits its scope to the following extents:

i. Investigating communication issues in the context of the Malaysian construction industry throughout peninsular Malaysia.

ii. The data are collected using a mix method approach which includes both qualitative and quantitative approaches through exploratory interviews and questionnaire surveys.

iii. Targeted respondents are Malaysian construction experts for interviews who are working in the managerial level or in a senior position. However, for questionnaire survey, the targeted respondents are company directors, project managers, architects, project engineers, site engineers, and quantity surveyors who work in consultancies and contracting firms which are registered under the Construction Industry Development Board (CIDB) Malaysia.

iv. The data collected is analysed using, thematic content analysis for qualitative and univariate and multivariate for quantitative analysis with the aid of statistical software including OTRANSCRIBE, Microsoft Excel, SPSS, and Smart-PLS. Smart-PLS is used to develop the structural relationship model. The model is then verified by engaging construction experts.

1.7 Research conceptual framework

The conceptual framework introduced a guideline of the research. Figure 1.1 shows the basic conceptual framework of the research.

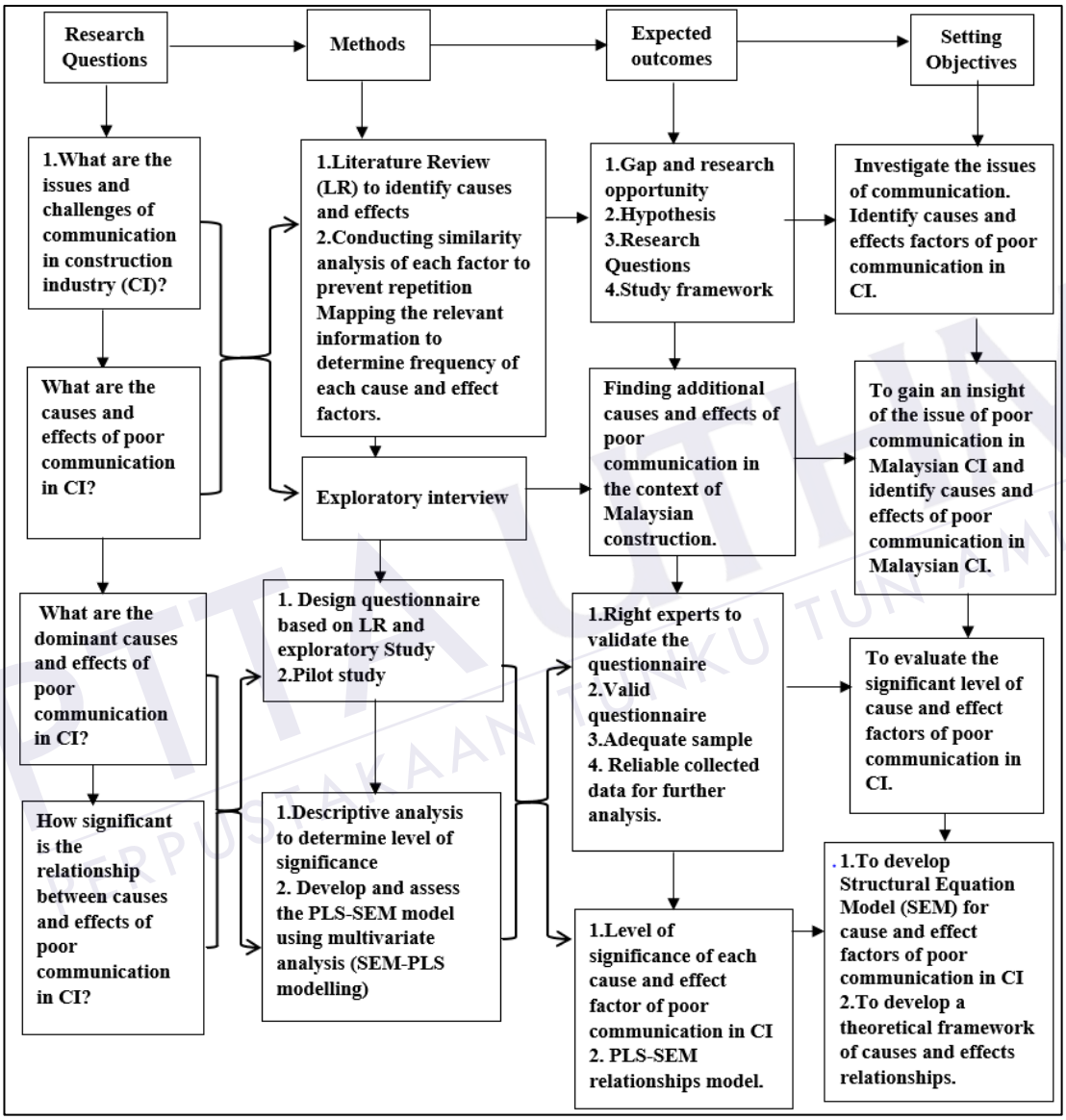

Figure 1.1: Conceptual framework

Figure 1.1 illustrates the research conceptual framework which represents the study synthesis starting with literature, methods, and results analysis. The conceptual framework is designed to answer the specified research questions by implying certain methods that can results to achieve the designated objectives.

REFERENCES

Abas, M., S.B. Khattak, I. Hussain, S. Maqsood Ahmad (2015). Evaluation of Factors Affecting the Quality of Construction Projects. Technical Journal, University of Engineering and Technology (UET) Taxila, Pakistan. Vol. 20(SI) No.2(S).

Abbas, A., Choi, M., Seo, J., Cha, S. H., & Li, H. (2019). Effectiveness of Immersive Virtual Reality-based Communication for Construction Projects. KSCE Journal of Civil Engineering, 23(12), 4972-4983.

Abd El-Razek, M. E., Bassioni, H. A., & Mobarak, A. M. (2008). Causes of delay in building construction projects in Egypt. Journal of Construction Engineering and Management, 134(11), pp.831-841.

Abdul Rahman, I., Memon, A. H., Karim, A., & Tarmizi, A. (2013). Significant factors causing cost overruns in large construction projects in Malaysia. Journal of Applied Science, 13(2), pp.286-293.

Abdullah, A. (2001). Understanding the Malaysian workforce: Guidelines for managers. Malaysian Institute of Management.

Abdullah, M. R. (2010). Significant causes and effects of construction delay. Master thesis, University Tun Hussein Onn Malaysia.

Abdul-Rahman, H., Berawi, M. A., Berawi, A. R., Mohamed, O., Othman, M., & Yahya, I. A. (2006). Delay mitigation in the Malaysian construction industry. Journal of construction engineering and management, 132(2), pp.125-133.

Abusafiya, H. A., & Suliman, S. M. (2017). Causes and Effects of Cost Overrun on Construction Project in Bahrain: Part 2 (PLS-SEM Path Modelling). Modern Applied Science, 11(7), pp.28-37.

Adnan, H. B., & Morledge, R. (2004). Joint venture projects in Malaysian construction industry factors critical to success (Doctoral dissertation, Nottingham Trent University).

Adnan, H., Shamsuddin, S. M., Supardi, A., & Ahmad, N. (2012). Conflict prevention in partnering projects. Procedia-Social and Behavioural Sciences, 35, pp.772-781.

Affare, M. A. W. (2012). An assessment of project communication management on construction projects in Ghana (Doctoral dissertation, Institute of Distance Learning, Kwame Nkrumah University of Science and Technology).

Afram, S.O., Bangdome-Dery, A., Eghan, G.E. and Kwofie, T.E. (2015) Analysis of Causes of Delay in Middle- and High-Income Self-Build Housing Projects (SBHPs) in Wa, Ghana. Journal of Building Construction and Planning Research, 3, 171-179. http://dx.doi.org/10.4236/jbcpr.2015.34017

Afshari, H., Khosravi, S., Ghorbanali, A., Borzabadi, M., & Valipour, M. (2010, December). Identification of causes of non-excusable delays of construction projects. In International Conference on E-Business Management and Economics (20), pp. 42-46.

Ahuja, Vanita, and Yang, Jay and Shankar, Ravi (2006). Web-Based Communication for Construction Project Management. In Proceedings World Conference on Accelerating Excellence in the Built Environment. Birmingham.

Aibinu, A. A., & Al-Lawati, A. M. (2010). Using PLS-SEM technique to model construction organizations' willingness to participate in e-bidding. Automation in construction, 19(6), pp.714-724.

Aiyewalehinmi (2013). Factor Analysis of Communication in the Construction Industry. The International Journal of Engineering and Science (IJES). Volume: 2, pp. 49-57.

Alaghbari, W. E., Razali A. Kadir, M., Salim, A., & Ernawati. (2007). the significant factors causing a delay of building construction projects in Malaysia. Engineering, Construction and Architectural Management, 14(2), pp.192-206.

Alem, A. (2018). Assessment on Critical Success Factors of Construction Projects (A Case of Ethiopian Shipping and Logistics Services Enterprise Construction Projects (Doctoral dissertation, Addis Ababa University).

Alhomidan, A. (2010). Factors affecting cost overrun in road construction projects in Saudi Arabia. International Journal of Civil & Environmental Engineering, 13(3), pp.1-4.

Ali, A. S., & Wen, K. H. (2011). Building defects: Possible solution for poor construction workmanship. Journal of Building Performance, 2(1).

Al-Kharashi, A., & Skitmore, M. (2009). Causes of delays in Saudi Arabian public sector construction projects. Construction Management and Economics, 27(1), pp.3-23.

Al-Najjar, J. M. (2008). Factors Influencing Time and Cost Overruns on Construction Projects in the Gaza Strip. Master thesis, Faculty of Engineering, the Islamic University, Gaza. Palestine.

Alwi, Sugiharto, and Hampson, Keith and Mohamed, Sherif (2002) Waste in the Indonesian construction projects. In Proceedings, the 1st International Conference of CIB W107 - Creating a Sustainable Construction Industry in Developing Countries, pp. 305-315, South Africa.

Alzeraa, A., Kazan, E. E., & Usmen, M. A. (2018). Impact of Project Communications Effectiveness on Construction Disputes. 6th Annual International Conference on Architecture and Civil Engineering (ACE 2018).

Anna, D., & Lars-Erik Gadde (2002) the construction industry as a loosely couple system: implications for productivity and innovation, Construction Management and Economics, 20:7, pp.621-631, DOI: 10.1080/01446190210163543.

Apolot, R., Alinaitwe, H., & Tindiwensi, D. (2011). An investigation into the causes of delay and cost overrun in Uganda's public sector construction projects. In *Second* International Conference on Advances in Engineering and Technology. pp. 305-311.

Armstrong, M. (2001). Handbook of Human Resource Management Practice (8th Edn), Kogan Page, London.

Arnorsson, H. (2012). Optimizing the Information Flow on the Construction Site. Master Thesis, Faculty of Engineering and Science, Aalborg University, Denmark.

Arshi Shakeel Faridi & Sameh Monir El-Sayegh. (2006). Significant factors causing a delay in the UAE construction industry. Construction Management and Economics, 24(11), pp.1167-1176.

Asadi, K., & Han, K. (2018). Real-time image-to-BIM registration using perspective alignment for automated construction monitoring. In Construction Research Congress (Vol. 2018, pp. 388-397).

Ashwini, A. A., & Rahul, R. S. (2014). Identification of critical construction delay factors. International Journal of Latest Trends in Engineering and Technology, 3(4), pp.256-261.

Assaf, S. A., Al-Khalil, M., & Al-Hazmi, M. (1995). Causes of delay in large building construction projects. Journal of management in engineering, 11(2), pp.45-50.

Assah-Kissiedu, M., Fugar, F. D. K., & Badu, E. (2010, July). Triggers of disputes within the Ghanaian construction industry. In Proceedings, 5th Built Environment Conference (Vol. 18, p. 20).

Astrachan, C. B., Patel, V. K., & Wanzenried, G. (2014). A comparative study of CB-SEM and PLS-SEM for theory development in family firm research. Journal of Family Business Strategy, 5(1), pp.116-128.

Aulich, T. (2013). The role of effective communication in the construction industry: a guide for education and health clients. Australasian Journal of Construction Economics and Building, 13 (4), pp. 92-101.

Azhar, N., Farooqui, R. U., & Ahmed, S. M. (2008, August). Cost overrun factors in construction industry of Pakistan. In First International Conference on Construction in Developing Countries (ICCIDC–I), Advancing and Integrating Construction Education, Research & Practice, pp. 499-508.

Aziz, R. F., & Hafez, S. M. (2013). Applying lean thinking in construction and performance improvement. Alexandria Engineering Journal, 52(4), 679-695.

Baguley, Phil (1994). Effective communication for modern business. London, New York: McGraw-Hill.

Ballan, S. (2007). Defining a value map for communication technologies in the Canadian construction industry. Master Thesis, University of Toronto.

Ballan, S., & El-Diraby, T. E. (2011). A Value map for communication systems in construction. Journal of Information Technology in Construction, 16(44), pp.745-760.

Bandulahewa, B. K. M. (2015). Effective project communication for construction project managers in Sri Lanka. Master thesis, University of Moratuwa Sri Lanka.

Barnlund, D. C. (1970). A transactional model of communication in K.K. Sereno and C.D. Mortenson (Eds.), Foundations of communication theory (pp. 83-92). New York, NY: Harper and Row.

Bassioni, H. A., Sarhan, A., & Zaki, A. S. (2013). Cost overrun causes related to the design phase in the Egyptian construction industry. Journal of Engineering Management Research, 1(5), pp.138-147.

Batool, A., & Abbas, F. (2017). Reasons for delay in selected hydro-power projects in Khyber Pakhtunkhwa (KPK), Pakistan. Renewable and Sustainable Energy Reviews, 73, pp.196-204.

Bentley, C. (2010). Prince2: a practical handbook. Abingdon, United Kingdom: Routledge.

Best, R., & De Valence, G. (2002). Design and Construction: Building in value. 1st edition. Abingdon, United Kingdom: Routledge.

Bhattacherjee, A. (2012). Social science research: principles, methods, and practices. Textbooks Collection. Book 3. University of South Florida Tampa, Florida, USA.

Board of Engineers Malaysia (2016). Professional Engineers. Retrieved on 29/4/2016. From: http://www.bem.org.my/v3/app_professional.html.

Bowen, N. K., & Guo, S. (2011). Structural equation modelling. Oxford, United Kingdom: Oxford University Press.

Brandt, A. (2017). Challenges in collaboration and communication between different professions within the built environment and construction industry. Master thesis, KTH Royal Institute of Technology, Sweden.

Bringezu, S., & Bleischwitz, R. (2017). Sustainable resource management: global trends, visions and policies. Abingdon, United Kingdom: Routledge.

British Standard Institution (2003). Poor communication costing UK construction industry. Press Release Retrieved from http://www.bsigroup.com/en-GB/about-bsi/media-centre/press-releases/2003/9/Poor-Communication-Costing-UK-Construction-Industry/#.VxcxjN_2ktF

Bryde, D., Broquetas, M., & Volm, J. M. (2013). The project benefits of building information modeling (BIM). International journal of project management, 31(7), pp.971-980.

Bubshait, A. A., & Al-Juwairah, Y. A. (2002). Factors contributing to construction costs in Saudi Arabia. Cost Engineering, 44(5), 30-34.

Bulmer, M. G. (1979). Principles of statistics. New York: Courier Corporation.

Butt, A., Naaranoja, M., & Savolainen, J. (2016). Project change stakeholder communication. International Journal of Project Management, 34(8), 1579-1595.

Buvik, M. P., & Rolfsen, M. (2015). Prior ties and trust development in project teams–A case study from the construction industry. International Journal of Project Management, 33(7), pp.1484-1494.

Buys, F., & Le Roux, M. (2014). Causes of defects in the South African housing construction industry: perceptions of built-environment stakeholders: review articles. Acta Structilia: Journal for the Physical and Development Sciences, 20(2), pp.78-99.

Cain, M. K., Zhang, Z., & Yuan, K. H. (2017). Univariate and multivariate skewness and kurtosis for measuring nonmorality: Prevalence, influence, and estimation. Behavior research methods, 49(5), pp.1716-1735.

Cakmak, E., & Cakmak, P. I. (2014). An analysis of causes of disputes in the construction industry using analytical network process. Procedia-Social and Behavioural Sciences, 109, pp.183-187.

Campbell, D. A. (2007, April). Building information modelling: the Web3D application for AEC. In Proceedings of the twelfth international conference on 3D web technology, pp. 173-176.

Campbell, S. W., & Russo, T. C. (2003). The social construction of mobile telephony: an application of the social influence model to perceptions and uses of mobile phones within personal communication networks. Communication Monographs, 70(4), 317-334.

Cassel, C. (1994). Qualitative methods in organizational research. London, Sage Publications.

Cerić, A. (2010). The impact of asymmetric information on communication risk in construction projects. In Engineering Project Organization Conference. Hrvatska znanstvena bibliografija i MZOS-Svibor.

Chan, D. W., & Kumaraswamy, M. M. (1997). A comparative study of the causes of time overruns in Hong Kong construction projects. International Journal of project management, 15(1), pp.55-63.

Chan, T. K. (2010). Increasing Construction Value Added: A Malaysian Case study. In W055-Special Track 18th CIB World Building Congress May 2010 Salford, United Kingdom.

Chau, K., Anson, M., & Zhang, J. (2005). 4D dynamic construction management and visualization software: 1. Development. Automation in Construction, 14(4), pp.512-524.

Chen, Y., & Kamara, J. (2008). The mechanisms of information communication on construction sites. In Forum E-journal, Vol. 8, No. 1, pp. 1-32.

Cheng, E. W., Li, H., Love, P. E., & Irani, Z. (2001). Network communication in the construction industry. Corporate Communications: An International Journal, 6(2), pp.61-70.

Chin, W. W. (1998). The partial least squares approach to structural equation modeling. Modern methods for business research, 295(2), pp.295-336.

Chong, H. Y., & Low, T. S. (2014). Accidents in Malaysian construction industry: statistical data and court cases. International Journal of Occupational Safety and Ergonomics, 20(3), pp.503-513.

CIDB, (2017). Country Report Malaysia. 22nd Asia Construct Conference Seoul, Korea, Retrieved from: http://www.cidb.gov.my/images/content/international/Malaysia----Country-Report-2017--22nd-Asia-Construct.pdf

Cohen, J. (1988). Statistical power analysis for the behavioural sciences. Hillsdale, NJ: L. Lawrence Earlbaum Associates.

Comrey, A. L., & Lee, H. B. (2013). The first course in factor analysis. Palmeira, United Kingdom: Psychology Press.

Connelly, L. M. (2008). Pilot studies. Medsurg Nursing, 17(6), pp.411-2.

Construction Industry Development Board CIDB. (2014). Annual Report. Retrieved March 19, 2016. From http://www.cidb.gov.my/cidbv4/index.php?lang=en

Construction Industry Development Board CIDB. (2015). Construction Quarterly Statistical Bulletin-Fourth Quarter 2015.retrieved January 2016 from http://www.cidb.gov.my/cidbv4/index.php?lang=en.

Coopers, P. W. (2012). Insights and Trends: Current Portfolio, Programme and Project Management Practices. Price Waterhouse Coopers. A report retrieved from http://www.pmi.org/~/media/PDF/RCP/PwC_PPPM_Trends_2012.ashx.

Costello, A. B., & Osborne, J. W. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. Practical assessment, research & evaluation, 10(7), pp.1-9.

Creswell, J. W. (1998). Qualitative inquiry and research design: Choosing among five traditions. Thousand Oaks, CA: Sage Publications.

Creswell, J. W. (2013). Research design: Qualitative, quantitative, and mixed methods approach. 3rd edition. Thousand Oaks, CA: Sage publications.

Crowe, A. (2005). The PMP exam: How to pass on your first try. Kennesaw, GA: Velociteach Press.

Dainty, A, Moore, D and Murray, M (2006). Communication in construction: Theory and practice, London: Taylor & Francis.

Darren, G., & Mallery, P. (1999). SPSS for Windows Step by Step: A simple guide and reference: Book SPSS for Windows Step by Step: A Simple Guide and Reference, Needham Heights, MA: Allyn & Bacon.

Darvik, L., & Larsson, J. (2010). The Impact of Material Delivery-Deviations on Costs and Performance in Construction Projects. Master's Thesis in the Design and Construction Project Management. Chalmers University of Technology. Sweden.

David Crosthwaite (2000). The global construction market: a cross-sectional analysis, Construction Management, and Economics, 18(5), pp.619-627.

Dawes, J. (2008). Do data characteristics change according to the number of scale points used? An experiment using 5-point, 7-point, and 10-point scales. International journal of market research, 50(1), pp.61-104.

Debs, L. D. C. E. (2016). A mixed methods study on choice of media influence on construction industry communication. Doctorate thesis, Purdue University.

Department of Statistics (2015). Quarterly Construction Statistics, Third Quarter 2015. Kuala Lumpur, Malaysia. Retrieved from: https://www.dosm.gov.my

Department of Statistics (2017). Quarterly construction statistics, third quarter of 2017. Kuala Lumpur, Malaysia. retrieved from: https://www.dosm.gov.my Development and Evaluation.

Dictionary, O. E. (1989). Oxford: Oxford university press.

Ding, G. K. (2008). Sustainable construction-the role of environmental assessment tools. Journal of environmental management, 86(3), pp.451-464.

Dingsdag, D. P., Sheahan, V. L., & Biggs, H. C. (2006). Safety Culture in the Construction Industry: Changing behavior through enforcement and education. In Proceedings Clients Driving Innovation: Moving Ideas into

Practice. The Second International Conference of the CRC for Construction Innovation.

Dingsdag, Donald P. and Biggs, Herbert C. and Sheahan, Vaughn L. and Cipolla, Dean J. (2006). A Construction Safety Competency Framework: Improving OH&S Performance by Creating and Maintaining a Safety Culture. CRC for Construction Innovation, Brisbane.

Doloi, H., Sawhney, A., Iyer, K. C., & Rentala, S. (2012). Analyzing factors affecting delays in Indian construction projects. International Journal of Project Management, 30(4), pp.479-489.

Durdyev, S., Ihtiyar, A., Banaitis, A., & Thurnell, D. (2018). The construction client satisfaction model: a PLS-SEM approach. Journal of Civil Engineering and Management, 24(1), pp.31-42. https://doi.org/10.3846/jcem.2018.297

Eastman, C. M., Eastman, C., Teicholz, P., & Sacks, R. (2011). BIM Handbook: A guide to building information modeling for owners, managers, designers, engineers, and contractors. New Jersey, United States: John Wiley & Sons.

Ekanayake, L., & Ofori, G. (2000). Construction material waste source evaluation. Proceeding of the strategies for a sustainable built environment, in Proceedings of the Strategies for a Sustainable Built Environment, Pretoria, South Africa.

Elazouni, A., & Salem, O. A. (2011). Progress monitoring of construction projects using pattern recognition techniques. Construction Management and Economics, 29(4), pp.355-370.

Ellis, R. and McClintock, A. (1990). You take my meaning: Theory into practice in human communication. London: Edward Arnold.

Emmitt, S., & Gorse, C. (2006). Communication in construction teams. London: Taylor & Francis.

Emuze, F., & James, M. (2013). Exploring communication challenges due to language and cultural diversity on South African construction sites. Acta Structilia, 20(1), pp.44-65.

Endut, I. R., Akintoye, A., & Kelly, J. (2009). Cost and time overruns of projects in Malaysia. Retrieved on March 16, 2016, 21, 243-252.https://www.irbnet.de/daten/iconda/CIB10633.pdf.

Enshassi, A., & Al Swaity, E. (2015). Key Stressors Leading to Construction Professionals' Stress in the Gaza Strip, Palestine. Journal of Construction in Developing Countries, 20(2), p53.

Enshassi, A., Al-Hallaq, K., & Mohamed, S. (2006). Causes of contractors' business failure in developing countries: the case of Palestine. Journal of construction in developing countries, 11(2), pp.1-14.

Enshassi, A., Al-Najjar, J., & Kumaraswamy, M. (2009). Delays and cost overruns in the construction projects in the Gaza Strip. Journal of Financial Management of Property and Construction, 14(2), pp.126-151.

Eriksson, M., & Lönnqvist Ekström, S. (2019). Coordination of Communication in Construction Projects-An investigation of how to coordinate communication from a project manager perspectiv (Master's thesis).

Erven, B. L. (2002). Overcoming barriers to communication. Ohio State University. Retrieved from: [http: //www.-ageconOhio State. edu/people/erven. 1/HRM/communication. pdf].

Falk, R. F., & Miller, N. B. (1992). A primer for soft modelling. Akron, OH, US: University of Akron Press.

Faridi, A. S., & El-Sayegh, S. M. (2006). Significant factors causing delay in the UAE construction industry. Construction Management and Economics, 24(11), pp.1167-1176.

Fayek, A. R., Dissanayake, M., & Campero, O. (2003). Measuring and classifying construction field rework: A pilot study. Presented to the Construction Owners Association of Alberta, Rework Committee, Edmonton, Alberta.

Fei, X., & Khan, T. H. (2015). Identifying Attributes for Expert Construction Project Managers in the Context of China. International Journal of Asian Social Science, 5(7), pp.407-418.

Fichet, H., & Giraud, L. (2007). How the information flow is processed in project-based companies compared to others and how it affects strategic drift. Master thesis. UMEA School of Business. Sweden.

Fornell, C., & Cha, J. (1994). Partial least squares. In R. P. Bagozzi (Ed.), Advanced methods of marketing research Cambridge: Blackwell. pp. 52–78.

Fornell, C., & Lacker, D. F. (1981). Evaluating structural equation modeling for travel behavior research. Transportation research part B, University of Michigan, 37, pp.1-25.

Frimpong, Y., Oluwoye, J., & Crawford, L. (2003). Causes of delay and cost overruns in the construction of groundwater projects in a developing country; Ghana as a case study. International Journal of project management, 21(5), pp.321-326.

Fugar, F. D., & Agyakwah-Baah, A. B. (2010). Delays in building construction projects in Ghana. Australasian Journal of Construction Economics and Building, 10(1/2), p.128.

Gamil, Y., & Rahman, I. A. (2017). Identification of causes and effects of poor communication in construction industry: A theoretical review. Emerging Science Journal, 1(4), 239-247.

Garson, D. (2012). Partial least squares: Regression and path modelling. Asheboro, NC: Statistical Publishing Associates.

Gavilan, R. M., & Bernold, L. E. (1994). Source evaluation of solid waste in building construction. Journal of Construction Engineering and Management, 120(3), pp.536-552.

Gebken, R. J., & Gibson, G. E. (2006). Quantification of costs for dispute resolution procedures in the construction industry. Journal of professional issues in engineering education and practice, 132(3), pp.264-271.

George, D. (2011). SPSS for windows step by step: A simple study guide and reference, 17.0 update, India: Pearson Education.

Gidado, Kassim and Niazai, Ghulam (2012) Causes of project delay in the construction industry in Afghanistan: EPPM2012, University of Brighton, UK, 10-11th September 2012

Gliem, J. A., & Gliem, R. R. (2003). Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for Likert-type scales. Midwest Research-to-Practice Conference in Adult, Continuing, and Community Education, The Ohio State University, Columbus, OH, October 8-10, 2003.

Goedert, J. D., & Meadati, P. (2008). Integrating construction process documentation into building information modelling. Journal of construction engineering and management, 134(7), pp.509-516.

Golparvar-Fard, M., Pena-Mora, F., & Savarese, S. (2009). D4AR–a 4-dimensional augmented reality model for automating construction progress monitoring data collection, processing, and communication. Journal of information technology in construction, 14(13), pp.129-153.

Gould, N. (1999). Dispute resolution in the construction industry: an evaluation of British practice. Thomas Telford.

Groeneveld, R. A., & Meeden, G. (1984). Measuring skewness and kurtosis. The Statistician, pp.391-399.

Gunhan, S., Senol, G., & Dogan, S. Z. (2012). Non-verbal cues: improving communication in construction projects. American Society for Engineering Education.

Hair Jr, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2014). A primer on partial least squares structural equation modeling (PLS-SEM). London: Sage Publications.

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed, a silver bullet. Journal of Marketing Theory and Practice, 19(2), pp.139-152.

Hamid M R Ab, Sami, MH, M. S. (2017). Discriminant Validity Assessment: Use of Fornell & Larcker Criterion versus HTMT Criterion. In Journal of Physics: Conference Series (Vol. 890, No. 012163, pp. 1-5). IOP Publishing Ltd.

Hammarlund, Y., & Josephson, P. E. (1991, September). Sources of quality failures in building. In Proc., European Symp. On Management, Quality and Economics in Housing and other Building Sectors Vol. 671, p. 679.

Hamzah Abdul-Rahman (1995). The cost of non-conformance during a highway project: a case study, Construction Management and Economics, 13(1), pp.23-32.

Hamzah, N., Khoiry, M. A., Arshad, I., Tawil, N. M., & Ani, A. C. (2011). Cause of construction delay-Theoretical framework. Procedia Engineering, 20, pp.490-495.

Haseeb, M., LuXinhai, Aneesa Bibi, Qazi Gulam Raqeeb. (2012) a case study on Importance of Delay Causes in Construction Projects of Pakistan. Asian Journal of Business and Management Sciences ISSN: 2047-2528 Vol. 1 No. 10 [94-101], www.ajbms.org.

Haslam, R. A., Hide, S. A., Gibb, A. G. F., Gyi, D. E., Atkinson, S., Pavitt, T. C & Suraji, A. (2003). causal factors in construction accidents. Health and Safety Executive, 156.

Haslam, R. A., Hide, S. A., Gibb, A. G., Gyi, D. E., Pavitt, T., Atkinson, S., & Duff, A. R. (2005). Contributing factors in construction accidents. Applied Ergonomics, 36(4), pp.401-415.

Hassan, H., Taib, N., & Rahman, Z. A. (2018, February). Virtual Design and Construction: a new communication in construction industry. In Proceedings of the 2nd International Conference on Digital Signal Processing, pp. 110-113.

Henderson, L. S., Stackman, R. W., & Lindekilde, R. (2016). The centrality of communication norm alignment, role clarity, and trust in global project teams. International Journal of Project Management, 34(8), pp.1717-1730.

Henseler, J., Hubona, G., & Ray, P. A. (2016). Using PLS path modelling in new technology research: updated guidelines. Industrial management & data systems, 116(1), pp.2-20.

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modelling. Journal of the academy of marketing science, 43(1), pp.115-135.

Hertzog, M. A. (2008). Considerations in determining sample size for pilot studies. Research in nursing & health, 31(2), pp.180-191.

Hill, B. D. (2011). Sequential Kaiser-Meyer-olkin Procedure as an Alternative for Determining the Number of Factors in Common-factor Analysis: A Monte Carlo Simulation (Doctoral dissertation, Oklahoma State University).

Ho, A. D., & Yu, C. C. (2015). Descriptive statistics for modern test score distributions: Skewness, kurtosis, discreteness, and ceiling effects. Educational and Psychological Measurement, 75(3), pp.365-388.

Hoezen, M., Reymen, I., & Dewulf, G. P. M. R. (2006). The problem of communication in construction. In F. Scheublin, A. Pronk, M. Prins, S. Emmitt, & A. den Otter (Eds.), Proceedings of the joint CIB, Tensinet, IASS International Conference on Adaptability in Design and Construction, Eindhoven: Eindhoven University of Technology, (pp. 12-14-12-19).

Hon, Carol K.H., Skitmore, Martin, Biggs, Herbert C., Chan, Albert P.C., & Alexander, Geoff (2015) Improving health and safety communication of migrant construction workers. In RICS COBRA AUBEA 2015, 8-10 July 2015, Sydney, NSW.

Hooper, D., Coughlan, J., Mullen, M (2008), Structural Equation Modelling: Guidelines for Determining Model Fit. Electronic Journal of Business Research Methods, 6(1), pp.53-60.

Hossain, L. (2009). Communications and coordination in construction projects. Construction Management and Economics, 27(1), pp.25-39.

Hosseini, M. R., Banihashemi, S., Rameezdeen, R., Golizadeh, H., Arashpour, M., & Ma, L. (2017). Sustainability by Information and Communication Technology: A paradigm shift for construction projects in Iran. Journal of Cleaner Production, 168, 1-13.

Huczynski, A. and Buchanan, D. (2001). Organizational Behaviour: An Introductory Text (4th edition), New Jersey: Essex, Prentice Hall.

Hussain, S., Fangwei, Z., Siddiqi, A., Ali, Z., & Shabbir, M. (2018). Structural equation model for evaluating factors affecting quality of social infrastructure projects. Sustainability, 10(5), p.1415.

Hussin, J. M., Rahman, I. A., & Memon, A. H. (2012). The Way Forward in Sustainable Construction: Issues and Challenges. International Journal of Advances in Applied Sciences (IJAAS), 1(3).

Iacobucci, D. (2010). Structural equations modeling: Fit indices, sample size, and advanced topics. Journal of Consumer Psychology, 20(1), pp.90-98.

Ibironke, O. T., Oladinrin, T. O., Adeniyi, O., & Eboreime, I. V. (2013). Analysis of Non-Excusable Delay Factors Influencing Contractors' Performance in Lagos State, Nigeria. Journal of Construction in Developing Countries, 18(1), pp.53-72.

Iqbal, S. M. J., Nawaz, M. S., Bahoo, S., & Abdul, M. L. (2017). Impact of Project Teamwork on Project Success in Pakistan. South Asian Journal of Management, 11(1), 1-13.

Isa, R. B., Jimoh, R. A., & Achuenu, E. (2013). An overview of the contribution of construction sector to sustainable development in Nigeria. Net Journal of Business Management, 1(1), pp.1-6.

Isaac, S., & Michael, W. B. (1995). Handbook in research and evaluation. San Diego, CA: Educational and Industrial Testing Services.

Jaafari, A. (1996). Human factors in the Australian construction industry: towards total quality management. Australian Journal of Management, 21(2), pp.159-185.

Jabri, M. (2017). Managing organizational change: Process, social construction and dialogue. Palgrave.

Jaffar, N., Tharim, A. A., & Shuib, M. N. (2011). Factors of conflict in construction industry: a literature review. Procedia Engineering, 20, pp.193-202.

Jean Jinghan Chen (1998). The characteristics and current status of China's construction industry, Construction Management and Economics, 16:6, 711-719, DOI: 10.1080/014461998372006.

Jesus, M., & Howitt, I. (1998). Wireless communication and computing at the construction job site. Automation in Construction, 7(4), pp.327-347.

Jung, Y., & Lee, S. (2010). Automated progress measurement and management in construction: variables for theory and implementation. Paper presented at the Proceedings of the International Conference on Computing in Civil and Building Engineering-2010 (ICCCBE 2010), Nottingham, UK, Paper.

Jureddi, D. N., & Brahmaiah, N. (2016). Barriers to effective communication. Journal of English Language and Literature, 3(2), pp.114-115.

Kaiser, H. F. (1958). The varimax criterion for analytic rotation in factor analysis. Psychometrika, 23(3), pp.187-200.

Kasimu, M. A., & Abubakar, D. I. (2012). Causes of delay in Nigeria construction industry. The Journal of contemporary research in business, 4(2).

Kassab, M., Hipel, K., & Hegazy, T. (2006). Conflict resolution in construction disputes using the graph model. Journal of construction engineering and management, 132(10), pp.1043-1052.

Kay Kent, (1996) "Communication as a core management discipline: The relationship between new management trends and the need for new perspectives in education in both management and public relations", Journal of Communication Management, 1(1), pp.29 – 36.

Kent, D. C., & Becerik-Gerber, B. (2010). Understanding construction industry experience and attitudes toward integrated project delivery. Journal of construction engineering and management, 136(8), pp.815-825.

Keyton, J. (2010). Communication and organizational culture: a key to understanding work experiences: a key to understanding work experiences. California, United States: Sage Publications.

Khahro, S. H., & Ali, T. H. (2014), Causes Leading to Conflicts in Construction Projects: A Viewpoint of Pakistani Construction Industry. International Conference on challenges in IT, Engineering and Technology (ICCIET'2014) July 17-18, 2014, Phuket, Thailand.

Khan, R. A., Liew, M. S., & Ghazali, Z. B. (2014). Malaysian construction sector and Malaysia vision 2020: Developed nation status. Procedia-social and behavioral sciences, 109, pp.507-513.

Kikwasi, G. (2013, February). Causes and effects of delays and disruptions in construction projects in Tanzania. In Australasian Journal of Construction Economics and Building-Conference Series. 1(2), pp. 52-59.

Kim, C., Son, H., & Kim, C. (2013a). Automated construction progress measurement using a 4D building information model and 3D data. Automation in Construction, 31, pp. 926-5805.

Kim, J. O., & Mueller, C. W. (1978). Factor analysis: Statistical methods and practical issues (No. 14). California, United States: Sage.

Kline, P. (2014). An easy guide to factor analysis. Abingdon, United Kingdom: Routledge. Taylor and Francis group.

Knapik, M. (2006). The qualitative research interview: Participants' responsive participation in knowledge making. International Journal of Qualitative Methods, 5(3), pp.77-93.

Kock, N., & Hadaya, P. (2018). Minimum sample size estimation in PLS-SEM: The inverse square root and gamma-exponential methods. Information Systems Journal, 28(1), pp.227-261.

Kornelius, L., & Wamelink, J. W. F. (1998). The virtual corporation: learning from construction. Supply Chain Management: An International Journal, 3(4), pp.193-202.

Kothari, C. R. (2004). Research Methodology: Methods and techniques. Second edition. New Age International.

Koushki, P. A., Al-Rashid, K., & Kartam, N. (2005). Delays and cost increases in the construction of private residential projects in Kuwait. Construction Management and Economics, 23(3), 285-294.

Kuang, C. H., Wong, N. L., & David, M. K. (2010). Communication Mode Among Malaysians. Proceedings of 2010 International Conference on Humanities, Historical and Social Sciences, ISBN 978-1-84626-025-4, Singapore, pp.26-28.

Kvale, S., & Brinkmann, S. (2009). Learning the craft of qualitative research interviewing. Thousand Oaks: Sage Publications.

Laihonen, H., Vuolle, M., & Käpylä, J. (2014, October). Negative Customer Experiences and Intellectual Liabilities in Construction Industry. In Proceedings of the 11th International Conference on Intellectual Capital, Knowledge Management and Organizational Learning: ICICKM2014 (p. 274). Academic Conferences Limited.

Landau, S., & Everitt, B. S. (2003). A handbook of statistical analyses using SPSS. Boca Raton, Florida, United States: Chapman and Hall/CRC.

Lee, J., & Bernold, L. E. (2008). Ubiquitous agent-based communication in construction. Journal of Computing in Civil Engineering, 22(1), pp.31-39.

Lee, S., & Pena-Mora, F. (2006). Visualization of construction progress monitoring. In Proc. of Joint Int. Conf. on Computing and Decision Making in Civil & Building Engrg, pp. 2527-2533.

Lee, U. K., Kim, J. H., Cho, H., & Kang, K. I. (2009). Development of a mobile safety monitoring system for construction sites. Automation in Construction, 18(3), pp.258-264.

Lessio, D., Philip, M., Wynn, D. C., & Clarkson, P. J. (2009). Communication and design process planning: initial insights from literature and industry interviews. In DS 58-Proceedings of ICED 09, the 17th International Conference on Engineering Design, Vol. 1, Design Processes, Palo Alto, CA, USA, pp.24.-27.

Li, B., Akintoye, A., Edwards, P. J., & Hardcastle, C. (2005). Critical success factors for PPP/PFI projects in the UK construction industry. Construction management and economics, 23(5), pp.459-471.

Liao, P. C., Lei, G., Fang, D., & Liu, W. (2014). The relationship between communication and construction safety climate in China. KSCE Journal of Civil Engineering, 18(4), pp.887-897.

Liu, Y. (2009). Critical factors for managing project communication among participants at the construction stage (Doctoral dissertation, The Hong Kong Polytechnic University).

Lo, T. Y., Fung, I. W., & Tung, K. C. (2006). Construction delays in Hong Kong civil engineering projects. Journal of Construction Engineering and Management, 132(6), pp.636-649.

Lohiya, G. (2010). Team Building in Project Management Practice in the UAE Construction Industry. MS Construction Management (Texas A&M University, USA).

Loosemore, M., & Lee, P. (2002). Communication problems with ethnic minorities in the construction industry. International Journal of Project Management, 20(7), pp.517-524.

Loosemore, M., & Muslmani, H. A. (1999). Construction project management in the Persian Gulf: inter-cultural communication. International Journal of Project Management, 17(2), pp.95-100.

Love, P. E., & Li, H. (2000). Quantifying the causes and costs of rework in construction. Construction Management & Economics, 18(4), pp.479-490.

Lu, Y., Li, Y., Skibniewski, M., Wu, Z., Wang, R., Le, Y. (2014). "Information and Communication Technology Applications in Architecture, Engineering, and Construction Organizations: A 15-Year Review." J. Manage. Eng., 10.1061/(ASCE)ME.1943-5479.0000319, A4014010.

Luo, L., He, Q., Xie, J., Yang, D., & Wu, G. (2017). Investigating the relationship between project complexity and success in complex construction projects. Journal of Management in Engineering, 33(2), 04016036.

Maguire, M., & Delahunt, B. (2017). Doing a thematic analysis: A practical, step-by-step guide for learning and teaching scholars. AISHE-J: The All Ireland Journal of Teaching and Learning in Higher Education, 9(3).

Mahamid, I. (2013). Effects of the project's physical characteristics on cost deviation in road construction. Journal of King Saud University-Engineering Sciences, 25(1), pp.81-88.

Malleson, A. (2013). National Construction Contracts and Law Survey 2013. ". NBS National Construction Contracts and Law Survey 2013, pp.08-21.

Maritz, M. J., & Hattingh, V. (2015). Electronic communication in the construction industry. Journal of Engineering, Design and Technology, 13(1), pp.74-93.

Mason, M. (2010, August). Sample size and saturation in Ph.D. studies using qualitative interviews. In Forum Qualitative Sozialforschung/Forum: Qualitative Social Research 11(3).

Mayor, M. (2009). Longman dictionary of contemporary English. London, United Kingdom: Pearson Education.

McNamara, C. (1999). General guidelines for conducting interviews, Rolla, Missouri, U.S, Minnesota. Missouri Institute of science.

Md-Ulang, N. (2012). Communication of construction health and safety information in design (Doctoral dissertation, Norhidayah Md Ulang). Loughborough University.

Memon, A. H, Rahman, I. A (2013). Structural modeling of cost overrun factors in construction industry (Doctoral dissertation, University Tun Hussein Onn Malaysia).

Memon, A. H., & Rahman, I. A. (2014). SEM-PLS analysis of inhibiting factors of cost performance for large construction projects in Malaysia: perspective of clients and consultants. The Scientific World Journal, 2014.

Memon, A. H., Ismail Abdul Rahman. (2014). Contractor perspective on time overrun factors in Malaysian construction projects. International Journal of Science, Environment, 3(3), pp.1184-1192.

Mezher, T. M., & Tawil, W. (1998). Causes of delays in the construction industry in Lebanon. Engineering, Construction and Architectural Management, 5(3), pp.252-260.

Mitkus, S., & Mitkus, T. (2014). Causes of conflicts in a construction industry: A communicational approach. Procedia-Social and Behavioural Sciences, 110, pp.777-786.

Mohamad, M. M., Sulaiman, N. L., Sern, L. C., & Salleh, K. M. (2015). Measuring the validity and reliability of research instruments. Procedia-Social and Behavioural Sciences, 204, pp.164-171.

Mohd Razaki, A., Ismail, A. R., & Adi Asmi, A. A. (2009). Delay in large MARA construction projects based on project management consultant perspective. Proceedings of MUCEET2009 Malaysian Technical Universities Conference on Engineering and Technology, Pahang, Malaysia.

Montes, G. M. (2018). Communication, trust and fluent relationships: keys for managing the social complexity in construction projects. Learnings from a case study. Innovative Journal of Business and Management, 7(02). Retrieved from http://www.innovativejournal.net/index.php/ijbm/article/view/2106

Morse, J. M. (1994). Designing funded qualitative research. In Denizin, N. K. & Lincoln, Y. S., Handbook of qualitative research (2nd Ed). Thousand Oaks, CA: Sage.

Moura, H. M. P., & Teixeira, J. M. C. (2010). Managing stakeholders' conflicts. Construction stakeholder management, 286-316.Chinyio, E., & Olomolaiye, P. (Eds.) John Wiley & Sons.

Muhwezi, L., Chamuriho, L. M., & Lema, N. M. (2012). An investigation into materials wastes on building construction projects in Kampala-Uganda. Scholarly Journal of Engineering Research, 1(1), pp.11-18.

Muthén, L. K. (2007). Mplus Statistical Analysis with Latent Variables User's Guide (5th ed.; Los Angeles, CA: Muthén and Muthén).

Mydin, M. O., Sani, N. M., Salim, N. A., & Alias, N. M. (2014). Assessment of Influential Causes of Construction Project Delay in Malaysian Private Housing from Developer's Viewpoint. In E3S Web of Conferences (Vol. 3, p. 01027). EDP Sciences.

Nagapan, S. (2014). Structural modelling of cause and effect factors of construction waste generation in Malaysian construction industry (Doctoral dissertation, Universiti Tun Hussein Onn Malaysia).

Nagapan, S., Rahman, I. A., & Asmi, A. (2012). Factors Contributing to Physical and Non-Physical Waste Generation in Construction Industry. International Journal of Advances in Applied Sciences, 1(1), pp.1-10.

Naresh K. Malhotra, (2006). Questionnaire design and scale development in Grover, R., & Vriens, M. The handbook of marketing research uses, misuses, and future advances. California, United States: Sage Publications.

Nguyen, T. P., & Chileshe, N. (2013). Revisiting the Critical Factors Causing Failure of Construction Projects in Vietnam (Doctoral dissertation, Association of Researchers in Construction Management).

Nigel C, James S, (2006) "Information management systems on construction projects: case reviews", Records Management Journal, 16(3), pp.131-148, https://doi.org/10.1108/09565690610713192

Norušis, M. J. (2006). SPSS 14.0 guide to data analysis. Upper Saddle River, NJ: Prentice Hall.

Nur Ain Ngah Nasaruddin, Ismail Abdul Rahman and Mustafa Musa Jaber (2018)."PLS-SEM Model of Leadership Characteristics facing Challenges in Malaysia Construction Industry "International Journal of Engineering & Technology, 7 (3.20), pp. 620-624.

Nyle´n K-O (1996). Cost of Failure in a Major Civil Engineering Project, Licentiate Thesis, Division of Construction Management and Economics, Department of Real Estate and Construction Management, Royal Institute of Technology, Stockholm, Sweden.

Odeh, A. M., & Battaineh, H. T. (2002). Causes of construction delay: traditional contracts. International journal of project management, 20(1), pp.67-73.

Ofori, G., & Gang, G. (2001). ISO 9000 certification of Singapore construction enterprises: its costs and benefits and its role in the development of the industry. Engineering, Construction and Architectural Management, 8(2), pp.145-157.

Olanrewaju, A., Tan, S. Y., & Kwan, L. F. (2017). Roles of Communication on Performance of the Construction Sector. Procedia Engineering, 196, pp.763-770.

Olawale, Y. A., & Sun, M. (2010). Cost and time control of construction projects: inhibiting factors and mitigating measures in practice. Construction Management and Economics, 28(5), pp.509-526.

Oluwaseun Sunday, D., & Olumide Afolarin, A. (2013). Causes, effects and remedies of errors in Nigerian construction documents. Organization, Technology & Management in Construction: An International Journal, 5(1), pp.676-686.

Omar, A. J., & Heywood, C. A. (2010). Understanding Internal Real Estate Provision Using a Marketing Approach. In W055-Special Track 18th CIB World Building Congress May 2010 Salford, United Kingdom (p. 229).

Omar, T., & Nehdi, M. L. (2016). Data acquisition technologies for construction progress tracking. Automation in Construction, 70, pp.143-155.

Onyegiri, Nwachukwu &Jamike. (2011). Information and communication technology in the construction industry. American Journal of Scientific and Industrial Research 2011, 2(3), pp.461-468.

Ortiz, O., Castells, F., & Sonnemann, G. (2009). Sustainability in the construction industry: A review of recent developments based on LCA. Construction and Building Materials, 23(1), pp.28-39.

Oshodi Olalekan, S., & Iyagba Rimaka (2013). A comparative study on causes and effects of delay in Nigerian and Iranian construction projects. Asian Journal of Business and Management Sciences.3(1), pp.29-36.

Othman N.A., M.A. Othuman Mydin (2014). Poor Workmanship in Construction of Low-Cost Housing. Analele Universităţii "EFTIMIE MURGU" RESIŁA ANUL XXI, NR. 1, 2014, ISSN 1453 – 7397.

Owolabi James, D., Amusan Lekan, M., Oloke, C. O., Olusanya, O., & Tunji-Olayeni, (2014). Causes and effect of delay on project construction delivery time. International Journal of Education and Research, 2(4), April 2014.

Pallant, J. (2013). SPSS survival manual. UK, McGraw-Hill Education.

Pandit, B., Albert, A., Patil, Y., & Al-Bayati, A. (2019). Fostering safety communication among construction workers: role of safety climate and crew-level cohesion. International journal of environmental research and public health, 16(1), p.71.

Pasley, G. P., & Roddis, W. K. (1994). Using Artificial Intelligence for Concurrent Design in the Steel Building Industry. Concurrent Engineering, 2(4), pp.303-310.

Pérez Gómez-Ferrer, A. (2017). Communication problems between actors in construction projects. Master thesis, Aalto University, Finland.

Peterson, F., & Fischer, M. (2009). Project monitoring methods exploratory case analysis: industry responses. In Computing in Civil Engineering, pp.105-114).

Peterson, R. A., & Kim, Y. (2013). On the relationship between coefficient alpha and composite reliability. Journal of Applied Psychology, 98(1), p.194.

Petrona, Amanda (2019). "Types of Narrative Research.", https://penandthepad.com/types-narrative-research-8346934.html. Accessed 29 April 2019.

PMBOK (2001). Project Management Body of Knowledge (PMBOK® Guide). In the Project Management Institute.

Pourrostam, T., & Ismail, A. (2012). Causes and effects of delay in Iranian construction projects. International Journal of Engineering and Technology, 4(5), pp.5-8.

Pozin, M. A. A., Nawi, M. N. M., Lee, A., & Azman, M. N. A. (2018). Improving communication in managing industrialised building system (IBS) projects: virtual environment. Malaysian Construction Research Journal, 2(2), pp.1-13.

Press Releases (March 2013) Project Management Institute (PMI)" more than half of all project budget risk is due to ineffective communications" (www.pmi.org).

PricewaterhouseCoopers (2001). A Benefits Analysis of Online Collaboration Tools within the Architecture, Engineering & Construction Industry. White Paper. http://www.pwcglobal.com.

Qais Kadhim Jahanger, (2013). Important Causes of Delay in Construction Projects in Baghdad City. Australian Journal of Basic and Applied Sciences, 7(4), pp.14-23.

Quill, T. E. (1995). Barriers to effective communication. In The medical interview New York, NY, Springer, pp. 110-121.

Ren, Z., Atout, M., & Jones, J. (2008, September). Root causes of construction project delays in Dubai. In PANNUAL ARCOM Conference (Vol. 24).

Retana, R., & Saleeb, N. (2016). Implementation Feasibility of a Digital Nervous System for the Construction Industry: For Efficient and Effective Information Management across the Project Lifecycle. Master Thesis, Middlesex University London.

Rigdon, E. E., Ringle, C. M., & Sarstedt, M. (2010). Structural modelling of heterogeneous data with partial least squares. In Review of marketing research, Emerald Group Publishing Limited. pp. 255-296.

Ringle, C. M., Wende, S., & Will, S. (2005). Smart-PLS 2.0 (M3) Beta, Hamburg 2005.

Ringle, Christian M., Wende, Sven, & Becker, Jan-Michael. (2015). Smart-PLS 3 Bönningstedt: SmartPLS. Retrieved from http://www.smartpls.com.

Root, D., & Blismas, N. G. (2003). Increasing questionnaire responses from industry: practices surrounding the use of postal questionnaires. In 19th Annual ARCOM Conference Vol. 2, pp. 623-631.

Rostami, A., & Oduoza, C. F. (2017). Key risks in construction projects in Italy: contractors' perspective. Engineering, Construction and Architectural Management, 24(3), pp.451-462.

Ruparelia, N. B. (2010). Software development lifecycle models. ACM SIGSOFT Software Engineering Notes, 35(3), pp.8-13.

Sadi Assaf, Mohammad A. Hassanain and Salman Al-Zahrani (2015). Causes of Contractors' Failure in Industrial Projects in Saudi Arabia Research Journal of Applied Sciences, Engineering and Technology 9(3): pp.158-164.

Salleh, N. A. B., Nordin, N. B. M., & Rashid, A. K. B. A. (2012). The language problem issue among foreign workers in the Malaysian construction industry. International Journal of Business and Social Science, 3(11).

Salleh, N. A., Nordin, N. M., & Rashid, A. K. A. (2012). The language problem issue among foreign workers in the Malaysian construction industry. International Journal of Business and Social Science, 3(11), pp.97-99.

Sambasivan, M., & Soon, Y. W. (2007). Causes and effects of delays in Malaysian construction industry. International Journal of Project Management, 25(5), pp.517-526.

Sandelowski, M. (2000). Combining qualitative and quantitative sampling, data collection, and analysis techniques in mixed-method studies. Research in nursing & health, 23(3), pp.246-255.

Sapnas, K. G., & Zeller, R. A. (2002). Minimizing sample size when using exploratory factor analysis for measurement. Journal of nursing measurement, 10(2), pp.135-154.

Sarshar, M. U. Isikdag, (2004), "A survey of ICT use in the Turkish construction industry", Engineering, Construction, and Architectural Management, 11(4), pp. 238 – 247.

Schreiber, J. B., Nora, A., Stage, F. K., Barlow, E. A., & King, J. (2006). Reporting structural equation modelling and confirmatory factor analysis results: A review. The Journal of educational research, 99(6), pp.323-338.

Schwalbe, K. (2015). Information technology project management. Eighths edition. Boston, Massachusetts, United States, Cengage Learning.

Schwarz, N., & Oyserman, D. (2001). Asking questions about behaviour: Cognition, communication, and questionnaire construction. American Journal of Evaluation, 22(2), pp.127-160.

Senaratne, S., & Ruwanpura, M. (2016). Communication in construction: a management perspective through case studies in Sri Lanka. Architectural Engineering and Design Management, 12(1), pp.3-18.

Shannon, C. E., & Weaver, W. (1949). The mathematical theory of communication. Urbana, Illinois: University of Illinois Press

Sharma, G. (2017). Pros and cons of different sampling techniques. International Journal of Applied Research, 3(7), pp.749-752.

Shehu, Z., Endut, I. R., Akintoye, A., & Holt, G. D. (2014). Cost overrun in the Malaysian construction industry projects: A deeper insight. International Journal of Project Management, 32(8), pp.1471-1480.

Sheldrick-Ross, C. and Dewdney, P. (1998) Communicating Professionally (2nd Edition), Library Association Publishing, London.

Shi, J. J., Cheung, S. O., & Arditi, D. (2001). Construction delay computation method. Journal of Construction Engineering and Management, 127(1), pp.60-65.

Sinesilassie, E. G., Tabish, S. Z. S., & Jha, K. N. (2017). Critical factors affecting cost performance: a case of Ethiopian public construction projects. International Journal of Construction Management, 18(2), pp.108-119.

Sinha, J. B. (2009). Culture and organizational behaviour. India, SAGE Publications.

Sinha, M., & Wayal, A. S. (2007). Dispute Causation in Construction Projects. IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE).

Spence, R., & Mulligan, H. (1995). Sustainable development and the construction industry. Habitat International, 19(3), pp.279-292.

Sricharoen, T., & Buchenrieder, G. (2005, October). Principal component analysis of poverty in northern Thailand. In Conference on international agricultural research for development, pp. 11-13.

Tabachnick, B. G., & Fidell, L. S. (2007). Using multivariate statistics. London, United Kingdom, Allyn & Bacon/Pearson Education.

Tai, S., Wang, Y., & Anumba, C. J. (2009). A survey on communications in large-scale construction projects in China. Engineering, Construction and Architectural Management, 16(2), pp.136-149.

Takim, R. (2005). A framework for successful construction project performance (Doctoral dissertation, Glasgow Caledonian University).

Takim, R., Akintoye, A., & Kelly, J. (2004, September). Analysis of measures of construction project success in Malaysia. In 20th Annual ACROM Conference, pp. 1-3.

Taleb,H , Syuhaida Ismail, Mohammad Hussaini Wahab and Wan Nurul Mardiah Wan Mohd Rani (2018). Managing communication between architects and clients during design phase. Malaysian Construction Research Journal.

Taylor-Powell, E., Renner, M. (2003). Analysing Qualitative Data. University of Wisconsin-Extension: Program

Teddlie, C., & Tashakkori, A. (Eds.). (2009). Foundations of mixed methods research: Integrating quantitative and qualitative approaches in the social and behavioral sciences. Sage Publications Inc.

Tenenhaus, M., Amato, S., & Esposito Vinzi, V. (2004, June). A global goodness-of-fit index for PLS structural equation modeling. In Proceedings of the XLII SIS scientific meeting,1(1), pp.739-742.

Tenenhaus, M., Vinzi, V. E., Chatelin, Y. M., & Lauro, C. (2005). PLS path modeling. Computational statistics & data analysis, 48(1), pp.159-205.

Thomas, S., Tucker, R., and Kelly, W. (1998). "Critical communications variables." J. Constr. Eng. Manage., 129(1), pp.58–66.

Thompson, B. (2004). Exploratory and confirmatory factor analysis: Understanding concepts and applications. USA, American Psychological Association.

Thorpe, T., & Mead, S. (2001). Project-specific websites: Friend or Foe? Journal of Construction Engineering and Management.

Thunberg, M., Rudberg, M., & Karrbom G.T. (2017). Categorizing on-site problems: A supply chain management perspective on construction projects. Construction Innovation, 17(1), pp.90-111.

Tipili, L, G, Patricia Oyiza Ojeba, Muhammad Sa'adiya Ilyasu (2014). Evaluating the effects of communication in construction project delivery in Nigeria. Global Journal of Environmental Science and Technology: ISSN-2360-7955, Vol. 2(5): pp.048-054.

Tongco, M. D. C. (2007). Purposive sampling as a tool for informant selection. Ethnobotany Research and applications, 5, pp.147-158.

Toor, S. U. R., & Ogunlana, S. O. (2008). Problems causing delays in major construction projects in Thailand. Construction Management and Economics, 26(4), pp.395-408.

Torrington, D., & Hall, S. (1998). Human resource management and the personnel function. london: Routledge.

Toufic M. Mezher, Wissam Tawil, (1998). Causes of delays in the construction industry in Lebanon, Engineering, Construction and Architectural Management, 5(3), pp.252 – 260.

Treece, E. W., & Treece, J. W. (1982). Elements of research in nursing. (3rd edition.). St. Louis, MO: Mosby.

Tumi, S. A. H., Omran, A., & Pakir, A. H. K. (2009, November). Causes of delay in construction industry in Libya. In the International Conference on Economics and Administration, pp.265-272.

Turley, F. (2010). "An Introduction to PRINCE2". Management Plaza.p.10.

Turunen, H., Vaismoradi, M., & Bondas, T. (2013). Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study. Nursing & Health Sciences.

Valitherm, A. N. A. N. T. H. A. N. (2014). Communication barrier in Malaysia construction sites. International Journal of Education and Research, 2(1), 1-10.

Van Teijlingen, E., & Hundley, V. (2001). The importance of pilot studies. Social research update, (35), pp.1-4.

Vinzi, V. E., Trinchera, L., & Amato, S. (2010). PLS path modelling: from foundations to recent developments and open issues for model assessment and improvement. In Handbook of partial least squares (pp. 47-82). Springer, Berlin, Heidelberg.

Waziri, F., & Khalfan, S. (2014). Cross-Cultural Communication in Construction Industry: How do Chinese Firms Cross the Barriers in Tanzania. European Journal of Business and Management, 6(13), pp.118-122.

Wetzels, M., Odekerken-Schröder, G., & Van Oppen, C. (2009). Using PLS path modelling for assessing hierarchical construct models: Guidelines and empirical illustration. MIS Quarterly, pp.177-195.

Williams, B., Onsman, A., & Brown, T. (2010). Exploratory factor analysis: A five-step guide for novices. Australasian Journal of Paramedicine, 8(3).

Wold, H. 1992. Soft Modeling: The Basic Design and Some Extensions, in Systems Under Indirect Observations: Part II, K. G. Jöreskog and H. Wold (eds.), North-Holland: Amsterdam, pp.1-54.

Wong, K. K. K. (2013). Partial least squares structural equation modelling (PLS-SEM) techniques using SmartPLS. Marketing Bulletin, 24(1), 1-32.

Xie, C., Wu, D., Luo, J., & Hu, X. (2010). A case study of multi-team communications in construction design under supply chain partnering. Supply Chain Management: An International Journal, 15(5), pp.363-370.

Xiong, B., Skitmore, M., & Xia, B. (2015). A critical review of structural equation modeling applications in construction research. Automation in Construction, 49, pp.59-70.

Yong, A. G., & Pearce, S. (2013). A beginner's guide to factor analysis: Focusing on exploratory factor analysis. Tutorials in quantitative methods for psychology, 9(2), pp.79-94.

Yuan, H. (2012). A model for evaluating the social performance of construction waste management. Waste management, 32(6), pp.1218-1228.

Zhang, C., & Conrad, F. (2014, July). Speeding in web surveys: The tendency to answer very fast and its association with straight lining. In Survey Research Methods,8(2), pp.127-135.

Zhang, J. (2010). A Social Semantic Web System for Coordinating Communication in the Architecture, Engineering & Construction Industry (Doctoral dissertation). University of Toronto, Canada.

Zhang, X., Bakis, N., Lukins, T. C., Ibrahim, Y. M., Wu, S., Kagioglou, M., Trucco, E. (2009). Automating progress measurement of construction projects. Automation in Construction, 18(3), pp.294-301.

Zulch, B. G. (2012). The Construction Project Manager as Communicator in the Property Development and Construction Industries. Doctoral dissertation, University of the Free State.

Zulch, B. G. (2014). Communication: The foundation of project management. Procedia Technology, 16, pp.1000-1009.